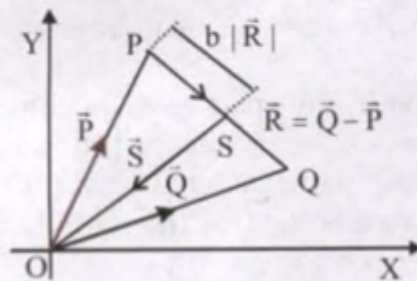Three vectors $\vec{P}, \vec{Q}$ and $\vec{R}$ are shown in the figure. Let S be any point on the vector $\vec{R}$. The distance between the points P and S is $b|\vec{R}|$. The general relation among vectors $\vec{P}, \vec{Q}$ and $\vec{S}$ is   [Adv. 2017]

(a) $\vec{S} = (1-b)\vec{P} + b\vec{Q}$ (b) $\vec{S} = (b-1)\vec{P} + b\vec{Q}$

(c) $\vec{S} = (1-b^2)\vec{P} + b\vec{Q}$ (d) $\vec{S} = (1-b)\vec{P} + b^2\vec{Q}$

(a) Here $\vec{P} + b\vec{R} = \vec{S} \Rightarrow \vec{R} = \dfrac{\vec{S} - \vec{P}}{b}$

Also $\vec{R} = \vec{Q} - \vec{P}$

$\therefore \quad \dfrac{\vec{S} - \vec{P}}{b} = \vec{Q} - \vec{P} \Rightarrow \vec{S} - \vec{P} = b\vec{Q} - b\vec{P}$

$\therefore \quad \vec{S} = b\vec{Q} + (1-b)\vec{P}$